

# UNDERWATER BRIDGE INSPECTION REPORT

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STRUCTURE NO. 7150

CSAH NO. 10

OVER THE

BLUE EARTH RIVER

DISTRICT 7 - BLUE EARTH COUNTY

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PREPARED FOR THE  
MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

JOB NO. 3512 (CEI 138)

MINNESOTA DEPARTMENT OF TRANSPORTATION  
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 7150, Piers 1 and 2, were found to be in good condition with no structurally significant defects observed. Both piers exhibited scour depressions up to 1.5 feet deep and partial footing exposure with up to 3 inches of vertical face exposure. A light to moderate accumulation of timber debris was also observed at both piers. The channel bottom appeared stable with no appreciable changes observed since the previous inspection.

INSPECTION FINDINGS:

- (A) The top of the footing was exposed from the upstream nose to the upstream quarter point along the south face of Pier 1 with 3 inches of vertical face exposure detected.
- (B) The footing was exposed along the mid portion of the north face of Pier 2 with 2 inches of vertical face exposure detected.
- (C) Scour depressions, 2 foot in radius and 1.5 foot deep (Pier 1) and 5 foot in radius and 1.5 foot deep (Pier 2), were observed at the upstream noses of both piers.
- (D) An area of section loss, 1.5 feet wide by 6 inches high with a penetration of 1/8 inch, was observed 1.5 feet below the waterline on the south face of the upstream end of Pier 1, and an area of section loss, 10 inches wide by 1.5 feet high with a penetration of 1 inch, was observed at the waterline on the downstream nose of Pier 1.
- (E) A light accumulation of 6-inch-diameter timber debris was scattered on the channel bottom around Pier 1, and a moderate accumulation of timber debris, up to 1 foot in diameter, was observed at the upstream end of Pier 2 and extending along the north face.

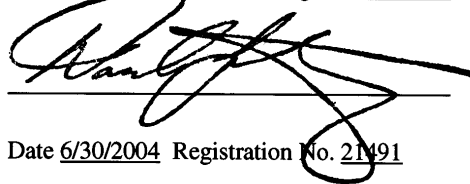
- (F) The north embankment exhibited heavy erosion due to poor slope protection.

RECOMMENDATIONS:

- (A) Monitor the timber debris at both piers, and if found to be increasing in the future, removal operations may become warranted to prevent any adverse affects on the bridge.
- (B) Monitor erosion of north embankment and review need to reestablish the erosion control measures necessary to protect the embankment at the North Abutment.
- (C) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

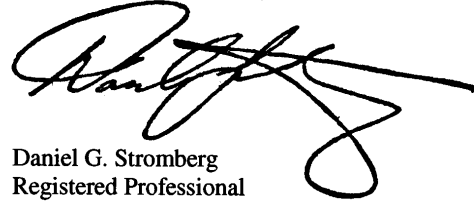
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

\_\_\_\_\_  
Daniel G. Stromberg

  
Date 6/30/2004 Registration No. 21491

Respectfully submitted,

COLLINS ENGINEERS, INC.



Daniel G. Stromberg  
Registered Professional  
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION  
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 7150

Feature Crossed: The Blue Earth River

Feature Carried: CSAH No. 10

Location: District 7 - Blue Earth County

Bridge Description: The bridge superstructure consists of three spans of multiple steel beams supporting a reinforced concrete deck. The superstructure is supported by two reinforced concrete abutments and two reinforced concrete piers. The pier footings are founded on steel H-piles, while the abutments are founded on treated timber piles. The piers are numbered 1 and 2 starting from the north end of the bridge.

2. INSPECTION DATA

Professional Engineer/Team Leader: Shirley M. Walker, P.E.

Dive Team: Michelle D. Koerbel, Clayton G. Brookins

Date: November 2, 2002

Weather Conditions: Sunny, " 35EF

Underwater Visibility: " 2 feet

Waterway Velocity: Negligible/None

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1 and 2.

General Shape: The piers consist of two elongated hexagonal columns supporting a rectangular pier cap. The pier columns are connected by an 8 foot tall concrete diaphragm that begins at the top of the footing. Each column is supported by a rectangular footing founded on steel H-piles.

Maximum Water Depth at Substructure Inspected: Approximately 5.2 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the diaphragm wall at Pier 1.

Water Surface: The waterline was approximately 4.2 feet below reference.

Waterline Elevation = 979.7.

5. NBIS CODING INFORMATION (Minnesota specific codes are used for 92B and 113)

Item 60: Substructure: Code 7

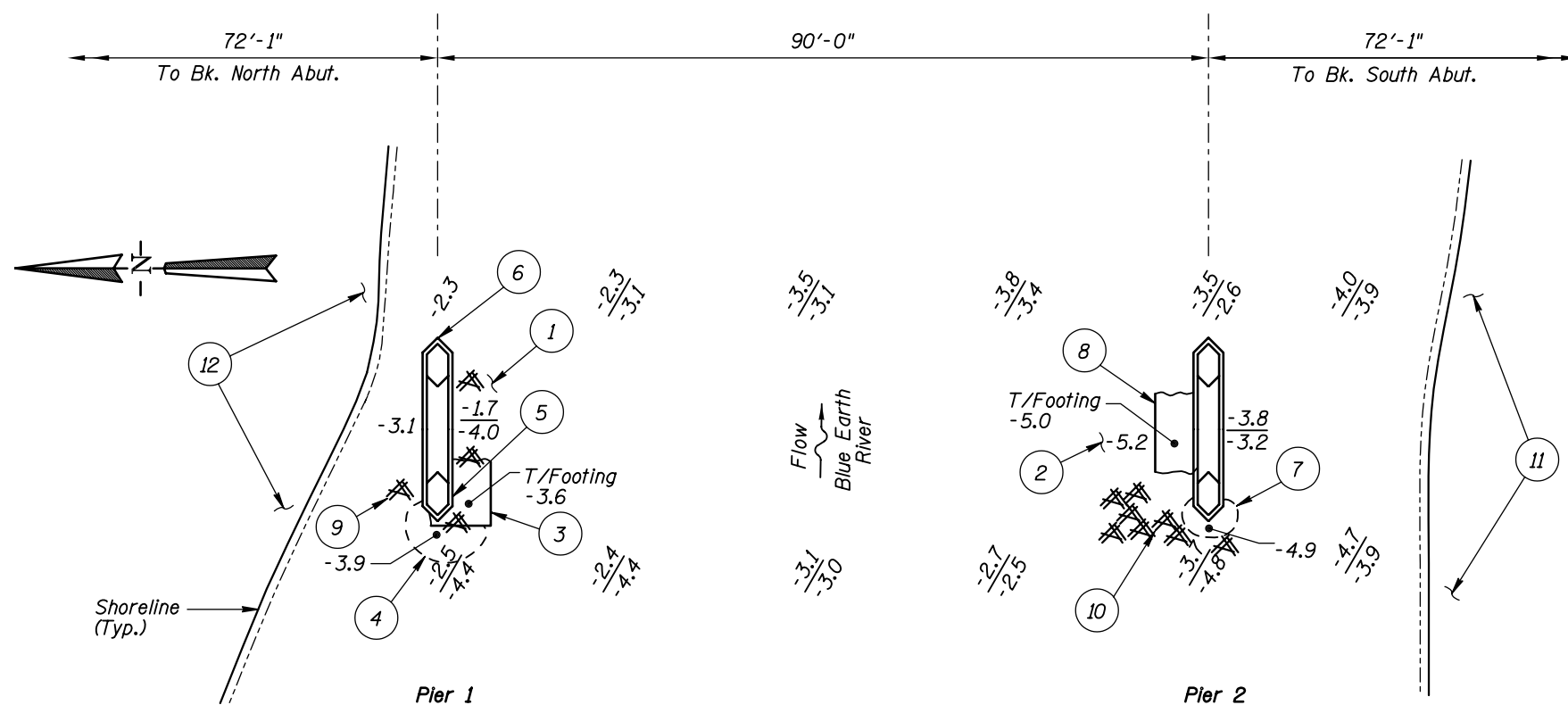
Item 61: Channel and Channel Protection: Code 5

Item 92B: Underwater Inspection: Code B/11/02

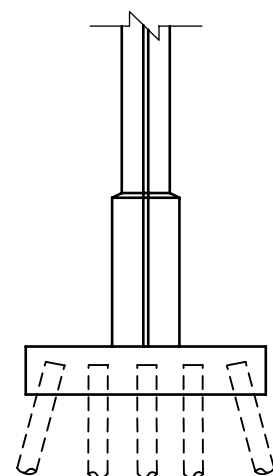
Item 113: Scour Critical Bridges: Code J/91

Bridge is scour critical because abutment or pier foundation is rated as unstable due to observed scour at bridge site.

\_\_\_\_\_ Yes   X   No



**SOUNDING PLAN**



**TYPICAL END VIEW OF PIERS**

**GENERAL NOTES:**

- Piers 1 and 2 were inspected underwater.
- At the time of inspection on November 2, 2002, the waterline was located approximately 4.2 feet below the top of the diaphragm wall at Pier 1. This corresponds to a waterline elevation of 979.7 based on the previous report dated September 20, 1997.
- Soundings indicate the water depth at the time of inspection and are measured in feet.
- Soundings were taken parallel to the bridge at 1/4 point intervals between the substructure units.

**INSPECTION NOTES:**

- The channel bottom consisted of gravel overlaid with fine silty sand with 2 inches of probe rod penetration.
- Then channel bottom consisted of fine silty sand with 2 inches of probe rod penetration.
- The top of the footing was exposed from the upstream nose to the upstream quarter point along the south face of Pier 1 with 3 inches of vertical face exposure detected.
- A scour depression, 2 feet in radius and 1.5 feet deep, was observed at the upstream nose of Pier 1.
- An area of section loss, 1.5 feet wide by 6 inches high with a penetration of 1/8 inch, was observed 1.5 feet below the waterline on the south face of the upstream end of Pier 1.
- An area of section loss, 10 inches wide by 1.5 feet high with a penetration of 1 inch, was observed at the waterline on the downstream nose of Pier 1.
- A scour depression, 5 feet in radius and 1.5 feet deep, was observed at the upstream nose of Pier 2.
- The footing was exposed along the north face of Pier 2 with 2 inches of vertical face exposure detected.
- A light accumulation of 6-inch-diameter timber debris was scattered on the channel bottom around Pier 1.
- A moderate accumulation of timber debris, up to 1 foot in diameter, was observed at the upstream end of Pier 2 and extending along the north face.
- The South Abutment was well protected with heavy riprap and large pieces of concrete.
- The north embankment exhibited heavy erosion due to poor slope protection.

**Legend**

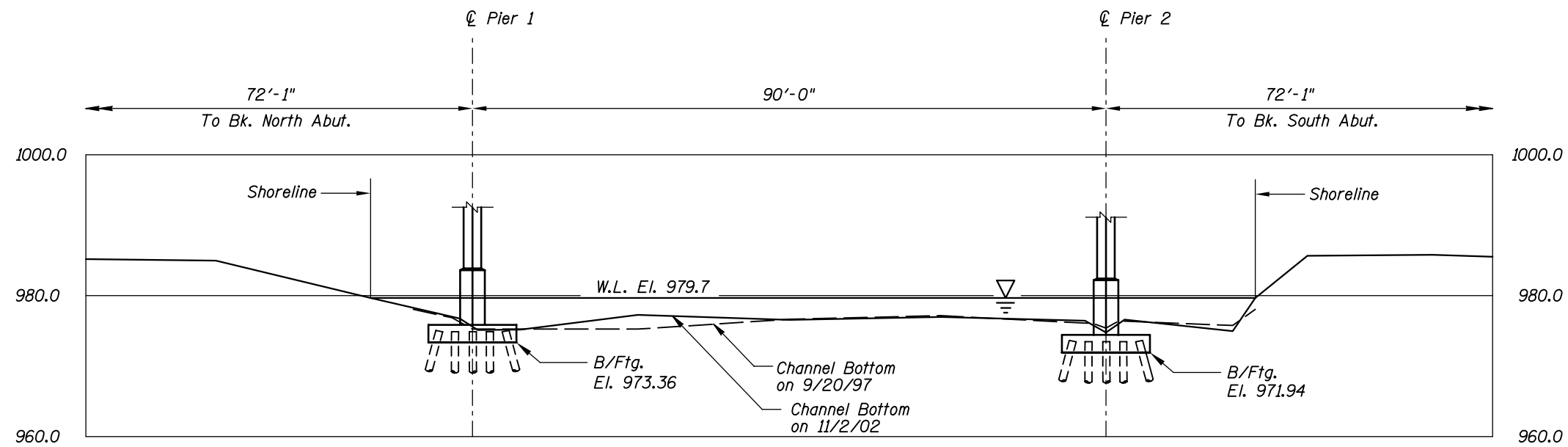
- 2.0 Sounding Depth from Waterline (11/2/02)
- 5.2 Sounding Depth from Waterline (9/20/97)
- Timber Debris
- Scour Depression

**MINNESOTA  
DEPARTMENT OF TRANSPORTATION  
UNDERWATER BRIDGE INSPECTION**

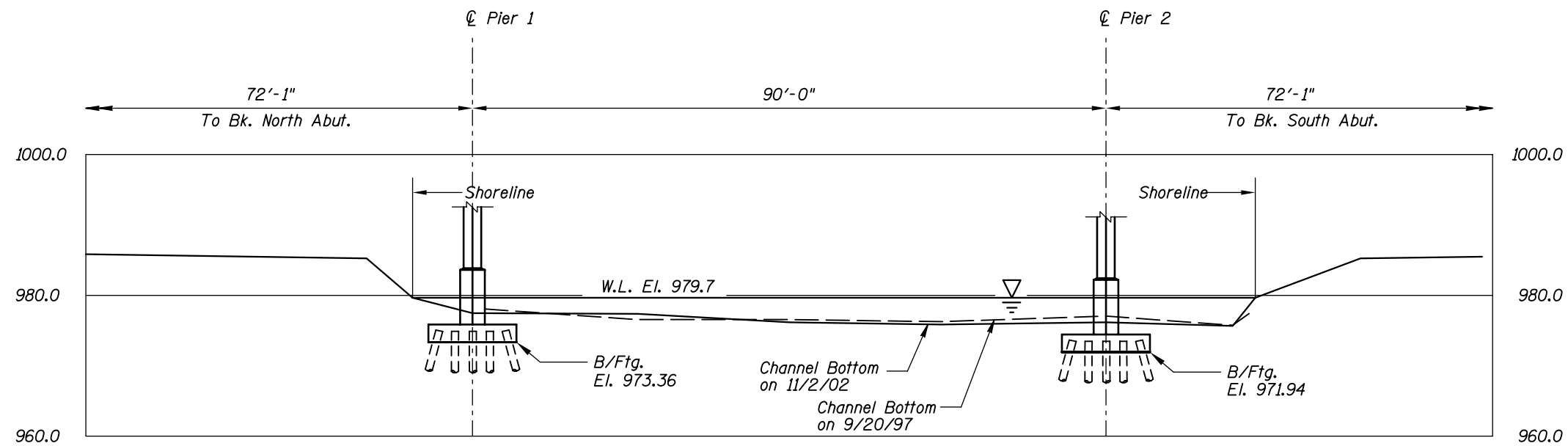
STRUCTURE NO. 7150  
OVER THE BLUE EARTH RIVER  
DISTRICT 7, BLUE EARTH COUNTY

**INSPECTION AND SOUNDING PLAN**

Drawn By: PRH	<b>COLLINS ENGINEERS, INC.</b>	Date: NOV. 2002
Checked By: MDK	300 W. WASHINGTON, STE. 600	Scale: NTS
Code: 35120138	CHICAGO, ILLINOIS 60606	Figure No.: 1
	(312) 704-9300	



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:  
Refer to Figure 1 for General Notes.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION			
STRUCTURE NO. 7150 OVER THE BLUE EARTH RIVER DISTRICT 7, BLUE EARTH COUNTY			
UPSTREAM AND DOWNSTREAM FASCIA PROFILES			
Drawn By: PRH	 <b>COLLINS ENGINEERS, INC.</b> 300 W. WASHINGTON, STE. 600 CHICAGO, ILLINOIS 60606 (312) 704-9300	Date: NOV. 2002	
Checked By: MDK		Scale: 1"=20'	
Code: 35I20I38		Figure No.: 2	





Photograph 1. View of Pier 1, Looking Southwest.



Photograph 2. View of Pier 2, Looking Southwest.





Photograph 3. View of North Embankment, Looking Northeast.

MINNESOTA DEPARTMENT OF TRANSPORTATION  
OFFICE OF BRIDGES AND STRUCTURES  
DAILY DIVING REPORT

INSPECTORS: Collins Engineers, Inc. DATE: November 2, 2002  
ON-SITE TEAM LEADER: Shirley M. Walker, P.E.  
BRIDGE NO: 7150 WEATHER: Sunny, " 35EF  
WATERWAY CROSSED: The Blue Earth River  
DIVING OPERATION: X SCUBA SURFACE SUPPLIED AIR  
OTHER

PERSONNEL: Michelle D. Koerbel, Clayton G. Brookins  
EQUIPMENT: Scuba, Probe Rod, Lead Line, Sounding Pole, U/W Light, Scraper, Camera  
TIME IN WATER: 12:10 p.m.  
TIME OUT OF WATER: 12:30 p.m.  
WATERWAY DATA: VELOCITY Negligible/None  
VISIBILITY " 2 foot  
DEPTH 5.2 feet maximum at Pier 2.

ELEMENTS INSPECTED: Piers 1 and 2

REMARKS: Overall, the concrete piers were found to be in good condition with no structurally significant defects observed. Both piers exhibited scour depressions, 1.5 feet deep and up to 5 feet in radius, at the upstream noses. Partial footing exposure was detected at both piers with up to 3 inches of vertical face exposure at the upstream nose of Pier 1 and 2 inches of vertical face exposure along the north face of Pier 2. A light (Pier 1) to moderate (Pier 2) accumulation of timber debris was observed at each pier. The north embankment exhibited heavy erosion due to poor slope protection.

FURTHER ACTION NEEDED: \_\_\_\_\_ YES  X  NO

Monitor the timber debris and if found to be increasing in the future, removal operations may become warranted to prevent any adverse affects on the bridge.

Monitor erosion of north embankment and review need to reestablish the erosion control measures necessary to protect the embankment at the North Abutment.

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

MINNESOTA DEPARTMENT OF TRANSPORTATION  
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 7150  
INSPECTORS Collins Engineers, Inc.  
ON-SITE TEAM LEADER Shirley M. Walker, P.E.  
WATERWAY CROSSED The Blue Earth River

INSPECTION DATE November 2, 2002  
NOTE: USE ALL APPLICABLE CONDITION  
DEFINITIONS AS DEFINED IN THE MINNESOTA  
RECORDING AND CODING GUIDE INCLUDING  
GENERAL, SUBSTRUCTURE, CHANNEL AND  
PROTECTION, AND CULVERTS AND WALL  
DEFINITIONS TO COMPLETE THIS FORM.

CONDITION RATING

UNIT REFERENCE NO.	UNIT DESCRIPTION	MAXIMUM DEPTH OF WATER	SUBSTRUCTURE						CHANNEL					GENERAL					
			PILING	COLUMNS, SHAFTS, OR FACES*	FOOTINGS	DISPLACEMENT	OTHER	OVERALL SUBSTRUCTURE CONDITION CODE*	SCOUR	EMBANKMENT EROSION	EMBANKMENT PROTECTION	OTHER (DRIFT/DEBRIS)	OVERALL CHANNEL & PROTECTION CONDITION	CONCRETE	STEEL	TIMBER	LOSS OF SECTION	PREVIOUS REPAIR OR MAINTENANCE	OTHER
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Pier 1	3.1'	N	7	8	9	N	7	6	5	5	7	5	7	N	N	8	N	N
	Pier 2	5.2'	N	8	8	9	N	8	6	8	8	6	6	8	N	N	N	N	N

\*UNDERWATER PORTION ONLY

REMARKS: Overall, the concrete piers were found to be in good condition with no structurally significant defects observed. Both piers exhibited scour depressions, 1.5 feet deep and up to 5 feet in radius, at the upstream noses. Partial footing exposure was detected at both piers with up to 3 inches of vertical face exposure at the upstream nose of Pier 1 and 2 inches of vertical face exposure along the north face of Pier 2. A light (Pier 1) to moderate (Pier 2) accumulation of timber debris was observed at each pier. The north embankment exhibited heavy erosion due to poor slope protection.

NOTES: ATTACH SKETCHES AS NEEDED, IDENTIFY REMARK BY REFERRING TO UNIT REFERENCE NO. AND REMARK NO.  
USE GENERAL SECTION TO IDENTIFY OVERALL PRESENCE OF SPALLS, CRACKS, CORROSION, ETC.